



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,306	10/14/2003	Thomas L. Ritzdorf	291958117US1	9845

25096 7590 11/15/2005

PERKINS COIE LLP
PATENT-SEA.
P.O. BOX 1247
SEATTLE, WA 98111-1247

EXAMINER

STOCK JR, GORDON J

ART UNIT	PAPER NUMBER
----------	--------------

2877

DATE MAILED: 11/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/685,306

Applicant(s)

RITZDORF ET AL.

Examiner

Gordon J. Stock

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-10,27,29-36 and 38-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10,27,29-36,38-42 and 45-52 is/are allowed.
- 6) ☒ Claim(s) 1,2,6-9 and 43 is/are rejected.
- 7) ☒ Claim(s) 3,5 and 44 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Amendment received on August 18, 2005 has been entered into the record.

Terminal Disclaimer

2. The terminal disclaimer filed on August 18, 2005 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of **U.S. Patent 6,428,673 B1** has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claim 8** is rejected under 35 U.S.C. 102(e) as being anticipated by **Somekh et al. (6,352,467)**—cited by applicant.

As for **claim 8**, Somekh in an integrated electrodeposition and chemical mechanical polishing tool discloses the following: an in-line metrology unit having a space for receiving a microelectronic workpiece for measuring a condition of a first layer on the microelectronic workpiece for generating a condition signal (col. 7, lines 35-50); a control, a cluster tool (Fig. 5: 10'), signal-connected to the metrology unit (col. 7, lines 55-57; Fig. 5: 86); a process unit providing a space to receive the microelectronic workpiece and performing an electrochemical process that is controlled by the control, the cluster tool (Fig. 5: 14); a chemical mechanical

polishing tool (Fig. 5: 16'); wherein the first layer comprises a layer on the workpiece just prior to cmp by the cmp tool (col. 7, lines 35-55).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claim 1** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Stanke et al. (6,690,473)**—previously cited in view of **Etherington (6,231,743)**—cited by applicant.

As for **claim 1**, Stanke in an integrated surface metrology system discloses the following: an in-line metrology unit having a space for receiving a wafer for measuring a condition of a first layer on the wafer (Fig. 1: 10), thickness of the layer prior to processing (col. 6, lines 8-15; col. 7, lines 44-45); a control, signal-connected to the metrology unit to indicate rework of the wafer or to provide control to processing (col. 7, lines 38-50); a process unit providing a space to receive the microelectronic workpiece, the wafer, and performing a process that is controlled by the control (col. 7, lines 38-50; Fig. 1: 14); wherein, the processing unit may be an electroplating unit (col. 24, lines 61-63); a transport unit positioned to receive the workpiece from at least one of the process unit and the in-line metrology unit and move the wafer to the other of the process unit and the in-line metrology unit (Fig. 1: 22). He is silent concerning the electroplating unit comprising a reactor having at least one anode and workpiece holder to hold the wafer as a cathode and wherein the process is dependent on the current between the two electrodes and adjustment of the current in response to the condition signal. However, Etherington in a method

for forming a semiconductor device teaches an electroplating device comprising a reactor (Fig. 1: 10) with an anode (Fig. 1: 14) with workpiece holder to hold the wafer as a cathode (Fig. 1: 155 and 15); wherein, the electroplating process is dependent upon the current (col. 1, lines 28-35); and wherein, the current is controlled based on the process conditions (col. 2, lines 25-35).

Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made that the electroplating unit would comprise an anode, a cathode comprising the wafer and wafer holder, and the current between the electrodes would be controllable in order to provide accurate film deposition onto a wafer during semiconductor fabrication.

7. **Claim 2** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Stanke et al. (6,690,473)**—previously cited in view of **Etherington (6,231,743)**—cited by applicant further in view of **Tsai et al. (6,177,780)**—previously cited.

As for **claim 2**, Stanke in view of Etherington discloses everything as above (see **claim 1**). Stanke is silent concerning a non-compliance unit wherein the transport unit is signal-connected to the control, and the condition signal from the metrology unit influences control to cause the transport unit to transfer the microelectronic workpiece to the noncompliance unit. However, Tsai in processing unit with in-line metrology teaches a noncompliance unit that is signal-connected to the control and the condition signal from the metrology unit influences the control to cause the transport unit to transfer the workpiece the non-compliance unit (col. 5, lines 40-55). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have a noncompliance unit with the transport unit coupled to the control in order to transfer workpieces to the noncompliance unit in order to have a system to remove unworkable or defective wafers from the production line.

Art Unit: 2877

8. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Stanke et al. (6,690,473)**—previously cited in view of **Etherington (6,231,743)**—cited by applicant further in view of **Wang (6,391,166)**—previously cited.

As for **claim 6**, Stanke in view of Etherington discloses everything as above (see **claim 1**). They are silent concerning a plurality of anodes with control adjusting current between anodes and cathode. However, Wang in an electroplating unit comprises controlling individually a plurality of anodes (Fig. 3b: 1, 2; 11-13, 21-23) Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the system comprise a plurality of anodes that are individually controllable in order to provide uniform film plating across the wafer surface.

9. **Claims 7 and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Stanke et al. (6,690,473)**—previously cited in view of **Etherington (6,231,743)**—cited by applicant further in view of **Somekh et al. (6,352,467)**—cited by applicant.

As for **claim 7**, Stanke in view of Etherington discloses everything as above (see **claim 1**). They are silent concerning having both a cmp and electroplating processing unit. However, Somekh in processing system teaches having an integrated electrodeposition and cmp tool with an in-line metrology device for optimal throughput (Fig. 5: 14, 16', 86; col. 6, lines 29-40). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have a cmp device in order to provide optimal production throughput.

As for **claim 9**, Stanke in view of Etherington discloses everything as above (see **claim 1**). They are silent concerning having both a cmp and electrochemical polishing tool with the first layer comprising a layer on the workpiece just after chemical mechanical polishing by the

Art Unit: 2877

chemical mechanical polishing tool. However, Somekh in a processing system teaches having an integrated electrodeposition and cmp tool with an in-line metrology device for optimal throughput (Fig. 5: 14, 16', 86; col. 6, lines 29-40). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have a cmp device in order to provide optimal production throughput. And Somekh discloses the layer being measured may be a layer just after polishing (col. 8, lines 5-10). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the layer be measured after polishing in order to monitor the quality of the polishing process.

10. **Claim 43** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Somekh et al. (6,352,467)**—cited by applicant further in view of **Tsai et al. (6,177,780)**—previously cited.

As for **claim 43**, Somekh discloses everything as above (see **claim 8**). Somekh is silent concerning a non-compliance unit wherein the transport unit is signal-connected to the control, and the condition signal from the metrology unit influences control to cause the transport unit to transfer the microelectronic workpiece to the noncompliance unit. However, Tsai in processing unit with in-line metrology teaches a noncompliance unit that is signal-connected to the control and the condition signal from the metrology unit influences the control to cause the transport unit to transfer the workpiece the non-compliance unit (col. 5, lines 40-55). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have a noncompliance unit with the transport unit coupled to the control in order to transfer workpieces to the noncompliance unit in order to have a system to remove unworkable or defective wafers from the production line.

Allowable Subject Matter

11. **Claims 10, 27, 29-36, 38-42, 45-52** are allowed.

Claims 3, 5, 44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to **claim 3**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a processing apparatus for processing a microelectronic workpiece the first layer comprises a seed layer and the process unit includes a seed layer enhancement unit, in combination with the rest of the limitations of **claim 3**.

As to **claim 5**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a processing apparatus for processing a microelectronic workpiece the condition signal is representative of a thickness of a seed layer, in combination with the rest of the limitations of **claim 5**.

As to **claim 10**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a processing apparatus for processing a microelectronic workpiece the metrology unit is configured to measure a thickness of a seed layer and measure a thickness of a process layer deposited on the seed layer, in combination with the rest of the limitations of **claims 10, 45-52**.

As to **claim 27**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a processing apparatus for processing a microelectronic workpiece the metrology unit is configured to generate a condition signal representative of a thickness of the seed layer, in combination with the rest of the limitations of **claims 27, 29-35**.

As to **claim 36**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a processing apparatus for processing a microelectronic workpiece the metrology unit is configured to generate a condition signal representative of a thickness of the seed layer, in combination with the rest of the limitations of **claims 36, 38-42**.

As to **claim 44**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a processing apparatus for processing a microelectronic workpiece the metrology unit is configured to measure a thickness of a seed layer and measure a thickness of a process layer deposited on the seed layer, in combination with the rest of the limitations of **claim 44**.

Response to Arguments

12. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

- 1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and
- 2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (571) 273-8300

Art Unit: 2877

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431.

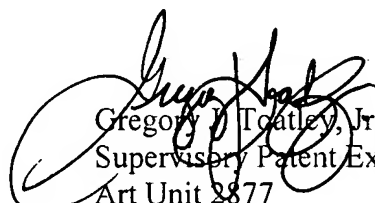
The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gs

November 13, 2005


Gregory J. Toatley, Jr.
Supervisory Patent Examiner
Art Unit 2877
14 Nov 05